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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,029	03/13/2001	Takuya Hirano	010294	8139

38834 7590 07/05/2005

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EXAMINER

PICH, PONNOREAY

ART UNIT	PAPER NUMBER
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2135

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Advisory Action  
Before the Filing of an Appeal Brief**

Application No.

09/787,029

Applicant(s)

HIRANO, TAKUYA

Examiner

Ponnoreay Pich

Art Unit

2135

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 20 June 2005 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☒ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: \_\_\_\_\_.  
Claim(s) objected to: \_\_\_\_\_.  
Claim(s) rejected: 1-14.  
Claim(s) withdrawn from consideration: 15-24 (are new claims, which are not entered.)

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See below.  
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_.  
13. ☐ Other: \_\_\_\_\_.

Applicant's amendments to claim 1 and newly added claims 15-24 will not be entered as they raise new issues after a final rejection has been made and would require reconsideration and/or new search on the part of the examiner. Any arguments applicant has which stem from the amendment to claim 1 and the newly added claims are therefore moot.

Applicant's first argument was directed to claim 1. Applicant stated in the first paragraph of page 17 that Werner never discloses "a quantum-mechanical probability distribution change of the difference signal measured by a recipient, which is produced by an eavesdropping operation." The examiner submits that claim 1 does not recite the argued limitation. The difference signal is not what is recited in claim 1 as the item being measured. Rather, claim 1 states that the distributions of two amplitude components are measured by the recipient. The difference signal is used to do the measuring.

Applicant next argues that Werner's apparatus is different from the claimed invention because though the claimed invention also uses a balanced homodyne detector, it is used by the recipient for detecting the phase signal sent by the sender, not by the eavesdropper for detecting the existence or non-existence of the photon on the system. The examiner notes that claim 1 as recited does not mention any of the limitations being argued by applicant in the second paragraph of page 17. The applicant is reminded that though the claims are read in light of the specification, limitations from the specification can't be read into the claims when the examiner is considering the claims.

Applicant then states that page 639 and 640, column 1 of Werner does not disclose the recited limitation of claim 1 because, "the joint-detection probability calculation can not derive a quantum-mechanical probability distribution change of the difference signal measured by a recipient, which is produced by an eavesdropping operation." The examiner has mentioned already how the difference signal is not what is recited as being measured in claim 1. Applicant's argument is based on misreading the claim. Pages 639 and 640 describes how by using QND measurement of photon numbers wherein a beam is separated into two 90 degree components, a photon can be determined to be present or not. The detection of excess photons would indicate the presence of an eavesdropper. Thus, pages 639-640 reads on the limitation recited in claim 1. Note that to detect the photon, the difference in the quadrature amplitude when a photon is present in the signal and when it is absent in the signal is analyzed (p640, col 2). This difference reads on the distribution of two amplitude components.

Applicant then notes that the previous examiner argues that the joint detection probabilities for both polarizer one and two depend on phase and amplitude of the signal. Applicant argues that Werner never describes that the joint-detection probability depends on the phase and the amplitude of the signal sent by the sender, but describes that if an eavesdropper increases the amplitude of the probe light for detecting more clearly, then the correlation probability between the signal detected by the eavesdropper and the signal detected by the recipient, namely the joint-detection probability, becomes lower. The examiner notes that on page 640, column 2, Werner discloses the quality of the measurement depends on the separation of the peaks and their relative width. This reads on the phase and amplitude of the signal affecting the quality of the measurement. The better the quality of the measurement, the higher the probability of detection. Note also that the probe signal is used to do the detecting as disclosed by Werner, not the signal sent by the sender.

Applicant then argues on page 19 that the apparatus of the invention uses a phase difference between signal light and reference light as the signal instead of photon counting, therefore the eavesdropping operation cannot be represented only by the quantum nondemolition measure of photon numbers, which the previous examiner argues represents the eavesdropping operation. The examiner notes that to count the photons, the difference in the quadrature amplitude readout when there is a photon present and when it is not present is used to do the counting. Therefore, Werner does not describe the eavesdropping operation as being done just by photon counting. Once again the examiner also notes that the claimed invention does not quite recite the limitation as applicant is arguing.

Next, applicant argues that the previous examiner's assertion that the recombined beams on page 640, column 1 represent the difference signal is incorrect. Applicant state that the DIFFERENCE CURRENT is derived from the probe light, not from the signal light. The examiner notes that claim 1 states that the signal light is produced by an eavesdropping operation. Therefore, since the probe light is used to analyze the signal light seen in Fig 1 of the claim, the probe light disclosed by Werner is the signal light recited in claim 1.

Applicant also argues in the same paragraph spanning page 19 and 20 that the apparatus of the invention also uses a balanced homodyne detector, but it is used by the recipient for detecting the phase signal sent by the sender, not by the eavesdropper for detecting the existence or non-existence of the photon on the system. The examiner notes that the term "recipient" is broad. As the eavesdropper also is effectively receiving information from the sender, the eavesdropper can also be considered a recipient. The claim language also does not mention who uses the balanced homodyne detector.

Applicant's last argument against Werner is that Werner uses the homodyne detection method for detecting a photon, but the applicant's invention uses it for one of the elements constituting the quantum cipher communication system which does not use photon counting method, therefore Werner and applicant's invention differs. The examiner has mention already how the differences signal is disclosed by Werner as being used to do the detecting of the photons. The examiner believes that Werner does read on the invention as claimed in claim 1, see the 4<sup>th</sup> paragraph above for more details.

Applicant's arguments directed towards claim 2 attacks the Bethune reference separately. The previous examiner used Bethune in combination with Werner to reject claim 2. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The rest of applicant's arguments are directed towards the claims as amended or towards newly added claims. The examiner has stated already how these arguments are moot. The examiner believes he has addressed all of applicant's arguments that needs to be addressed and have shown that the application is not in a condition for allowance. Please note that the application was docketed to a new examiner, Ponnoreay Pich (571-272-7962), and any questions regarding the application should be directed to the new examiner.



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